

CLAIMS

What is claimed is:

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1. A method for making a heat transfer component comprising the steps of:
forming a plurality of cells of a norbornene polymer; and
using said cells as part of said heat transfer component.
 2. The method as recited in claim 1 wherein the step of forming each of said plurality of cells includes melting said norbornene polymer and hot extruding at least one extruded tube.
 3. The method as recited in claim 2 wherein the step of forming each of said plurality of cells includes extruding an inner extruded tube and an outer extruded tube, the method further comprising expanding said inner extruded tube with air in an inner mold to form an inner expanded tube and expanding said outer extruded tube with air in an outer mold to form a substantially u-shaped outer expanded tube.
 4. The method as recited in claim 3 wherein said inner expanded tube and said outer expanded tube include a plurality of tubes grooves formed by expanding said inner extruded tube and said outer extruded tubes into said inner mold and said outer mold, respectively, each including a plurality of mold grooves.
 5. The method as recited in claim 3 further comprising the step of attaching an inner end of said inner expanded tube and a pair of outer ends of said outer expanded tube to a flange to form one of said cells, said inner expanded tube being positioned in an opening of said outer expanded tube positioned between said pair of outer ends, a flue gas passage containing a flue gas being defined between said inner expanded tube and said outer expanded tube.

6. The method as recited in claim 5 wherein said flange is made of said norbornene polymer, and the step of attaching said inner end and said outer ends to said flange includes thermally adhering said inner end and said outer ends to said flange.
7. The method as recited in claim 5 wherein said flange is made of metal, and the step of attaching said inner end and said outer ends to said flange includes heating and flaring said inner end and said outer ends.
8. The method as recited in claim 2 wherein the step of forming each of said plurality of cells include expanding said at least one extruded tube with air in a mold to form a substantially w-shaped expanded tube and attaching a pair of ends of said expanded tube to a flange to form one of said cells, a flue gas passage being defined in said expanded tube.
9. The method as recited in claim 2 wherein said at least one extruded tube is employed in a shell and tube heat exchanger.

10. A method for making a heat transfer component comprising the step of:

melting a norbornene polymer;

hot extruding an inner extruded tube and an outer extruded tube;

expanding said inner extruded tube with air within an inner mold having a plurality of mold grooves to form an inner expanded tube having a plurality of tube grooves and expanding said outer extruded tube with air within an outer mold having said plurality of mold grooves to form a substantially u-shaped outer expanded tube having said plurality of tube grooves;

attaching an inner end of said inner expanded tube and a pair of outer ends of said outer expanded tube to a flange to form one of at least one cell, said inner expanded tube being positioned in an opening of said outer expanded tube positioned between said pair of outer ends, a flue gas passage containing a flue gas being defined between said inner expanded outer tube and said expanded tube; and

attaching said at least one cell to said flange, an air flow passage being defined between each of said at least one cell to exchange heat with flue gas flowing through said flue gas passage.

11. The method as recited in claim 10 wherein said flange is made of said norbornene polymer, and the step of attaching said inner end and said outer ends to said flange includes thermally adhering said inner end and said outer ends to said flange.

12. The method as recited in claim 10 wherein said flange is made of metal, and the step of attaching said inner end and said outer ends to said flange includes heating and flaring said inner end and said outer ends.

13. A heat transfer component comprising:
at least one cell including at least one expanded tube formed of a norbornene polymer;
a flue gas passage to contain a flue gas; and
an air flow passage located between each of said at least one cell to exchange heat with flue gas flowing through said flue gas passage.
14. The heat transfer component as recited in claim 13 wherein said at least one cell includes an outer expanded tube and an inner expanded tube and said flue gas passage is located between said expanded outer tube and said expanded inner tube to contain said flue gas.
15. The heat transfer component as recited in claim 14 wherein said expanded outer tube is substantially U-shaped and includes an opening and said expanded inner tube is positioned within said opening.
16. The heat transfer component as recited in claim 14 wherein said inner expanded tube and said outer expanded tube include a plurality of grooved surfaces.
17. The heat transfer component as recited in claim 14 wherein a pair of outer ends of said outer expanded tube and an inner end of said inner expanded tube are attached to a flange.
18. The heat transfer component as recited in claim 17 wherein said flange is made of said norbornene polymer, and said inner end and said pair of outer ends are thermally adhered to said flange.

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